

REMARKS

Reconsideration and allowance of this application are respectfully requested in light of the above amendments and the following remarks.

The title of the invention has been amended to better describe the claimed subject matter and, thereby, overcome the applied objection.

Claims 1-42 have been canceled in favor of new claims 43-56. Support for the amendments is provided at least in embodiments 9 and 11 of the invention described in the specification.

Claims 1, 2, 5-7, 11, 18, 19, 22-24, 28, 41, and 42 were rejected, under 35 USC §102(b), as being anticipated by Jin et al. (JP 08-263096). Claims 3, 4, 9, 10, 12-17, 20, 21, 26, 27, and 29-34 were rejected, under 35 USC § 103(a), as being unpatentable over Jin in view of Kono (JP 08-046517). Claims 8 and 25 were rejected, under 35 USC §103(a), as being unpatentable over Jin in view of Oshikiri et al. (US 5,819,213). Claims 35-40 were rejected, under 35 USC §103(a), as being unpatentable over Ebara et al. (JP 2000-322097) in view of Jin. To the extent these rejections may be deemed applicable to new claims 43-56, the Applicant respectfully traverses.

Claim 1 now defines a sound coding apparatus having a first coding section that performs weighting on an input signal, to mask a spectrum of quantization distortion by a spectral envelope of the input signal, and encodes the input signal to obtain first coding information. A decoding section decodes the first coding information to obtain a decoded signal. A specifying section calculates an auditory masking threshold for a decoded spectrum that is obtained from the decoded signal and, by performing a scale adjustment and normalization of the decoded

spectrum, generates an error spectrum that is compared against the auditory masking threshold. The specifying section also specifies a frequency region in the error spectrum showing an amplitude equal to or greater than the auditory masking threshold. A subtracting section obtains a residual error signal of the input signal and the decoded signal. A second coding section encodes the frequency region in the residual error signal specified by the specifying section and obtains second coding information. With the claimed subject matter, high-quality coding, at a low bit rate, of a speech signal superimposed on music or environmental sound may be supported (see specification page 4, lines 2-7).

In the field of sound coding and decoding, performing comparison processing with an auditory masking threshold on the decoding side is not common, because the error spectrum used in comparison with the auditory masking threshold represents the difference between the input spectrum of the source signal and a specific decoded spectrum and it is not possible to obtain the input spectrum at the decoding side. However, with the claimed invention, an input signal is subjected to weighting on the coding side and a spectrum of quantization distortion is masked by the spectral envelope of the input signal. In this way, the error spectrum has a shape that is correlated with the spectral envelope of the input signal.

To allow the decoding side to identify the frequency region of the coding target, a spectrum obtained from a decoded signal is used as an error spectrum and the decoded spectrum is compared against the masking threshold, at both the coding side and the decoding side, to limit the frequency region of the coding target. However, this decoded spectrum is still not close enough to the error spectrum. The claimed invention also performs a scale adjustment and normalization of the decoded spectrum so as to make the decoded spectrum closer to the error

spectrum. Thus, the claimed invention provides features of (1) masking the spectrum of quantization distortion, by the spectral envelope of an input signal, by performing weighting on the input signal, (2) limiting the frequency region to be the target of coding by using a decoded spectrum as an error signal and comparing the decoded spectrum and the masking threshold, and (3) performing a scale adjustment and normalization of the decoded spectrum.

Jin discloses coding an entire band. By contrast with Jin, the claimed invention limits the band to be the target of higher layer coding and encodes the limited band alone. In particular, the claimed invention determines this band of coding target using a lower layer decoded signal. A lower layer decoded signal can be obtained in a decoder, and so with the claimed invention it is not necessary to transmit additional information for use in determining the band from the coding side to the decoding side. The claimed invention thus make possible lower bit rates than used by Jin, by not transmitting additional information and limiting the band that is the target of coding.

Furthermore, Jin does not disclose or suggest the claimed feature of performing a scale adjustment and normalization of a decoded spectrum.

Kono discloses finding, in a frequency region showing an amplitude equal to or greater than an auditory masking threshold, the difference between the threshold and the auditory masking threshold and determining a distribution of encoded bits based on the difference. However, Kono's configuration is employed at the coding side and bears no relationship to the claimed invention, which is directed to enabling comparison processing with an auditory masking threshold at the decoding side. Thus, Kono does not disclose or suggest the above-noted feature of the claimed invention.

Oshikiri and Ebara do not supplement the teachings of Jin and Kono with respect to the above-mentioned features distinguishing claim 43 from the applied references.

Accordingly, Applicant submits that Jin, Kono, Oshikiri and Ebara, considered individually or in combination, do not render obvious the subject matter defined by new claim 43. Independent claim 55 similarly recites the above-mentioned subject matter distinguishing apparatus claim 43 from the applied references, but with respect to a method. Accordingly, Applicant submits that allowance of claims 43 and 55 and all claims dependent therefrom is warranted.

In view of the above, it is submitted that this application is in condition for allowance and a notice to that effect is respectfully solicited.

If any issues remain which may best be resolved through a telephone communication, the Examiner is requested to telephone the undersigned at the local Washington, D.C. telephone number listed below.

Respectfully submitted,

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